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THE
Journal of the Society of Arts,
AND OF
THE INSTITUTIONS IN UNION.

110th Session.] FRIDAY, MAY 20, 1864. [No. 600. Vol. XII.

Announcements by the Council.

Presentation of Medals and Prizes.

His Royal Highness the Prince of Wales, K.G., President of the Society, has been pleased to appoint Friday, the 24th of June, at three o'clock, to present the medals and prizes awarded during the present Session. The Presentation will take place at Willis's Rooms, King-street, St. James's. Members will be admitted by ticket only, for which application should be made to the Secretary; each ticket to admit the member and one lady. The tickets will be ready for delivery on and after the 1st June.

Ordinary Meetings.

Wednesday Evenings, at 8 o'clock.

May 25.—Derby-day. No Meeting.

Cottages for the Labouring Classes.

A Special Conference will be held at the Society's House, on Thursday, the 26th, and Friday, the 27th inst., to which the Council invite all those members of the Society of Arts who have seats in the Legislature, such other members as are known to take a special interest in the subject, the Presidents of the Institutions in Union with the Society, and other noblemen and gentlemen whose co-operation may be deemed important.

The Conference each day will be opened at 11·30 *precisely*, and closed not later than 4 o'clock, the chair being taken by the Chairman of the Council.

The discussion will be taken :—

1. On the insufficient number of habitations for the labouring classes in town and country.
2. On the badness of the existing accommodation.
3. On the effects arising from this state of things, viz. :—
   (*A*) Religious, moral, and social.
   (*B*) Sanitary.
   (*C*) Economic.
4. On the causes to which these evils may be, or have been, attributed, such as—
   (*A*) The Law of Settlement.
   (*B*) The Poor Laws.
   (*C*) Tenure of property, such as mortmain, leasehold system, tenancy for life, &c.
   (*D*) Legal difficulties affecting the transfer of property.
   (*E*) Difficulty of providing proper dwellings at a cost which will be remunerative to capital in town and country.
5. Remedies:—
   (*A*) What can be done by Legislation?
   (*B*) What can be done without Legislation?
   (*C*) What assistance, if any, can the Society give in either of these directions?

The various plans sent in, in competition for the prizes offered by Mr. J. Bailey Denton, through the Society, are now hung on the walls of the meeting-room, and may be inspected by the members and their friends.

Statistics of Model Dwellings.

The report of the Committee appointed by the Council to consider this subject, consisting of the Hon. and Rev. Samuel Best, Mr. Samuel Gregson, M.P., Mr. Chandos Wren Hoskyns, Mr. Thomas Twining, Mr. Henry M. Eyton (architect), and Mr. George C. Rigby (builder), has been published, and any member of the Society interested in the subject may have copies on application to the Secretary. This inquiry was originated at the suggestion of Mr. Twining, who has also kindly defrayed the expenses of it, and of the publication of the report.

Proceedings of the Society.

Twenty-second Ordinary Meeting.

Wednesday, May 18th, 1864; Wm. Hawes, Esq., Chairman of Council, in the chair.

The following candidates were proposed for election as members of the Society :—

Callender, William Romaine, F.S.A., Victoria-park, Manchester.
Campbell, Rev. William, Privy Council Office, S.W.
Johnston, William, 32, Buckingham-terrace, Glasgow.
Locke, John, 83, Addison-road, Kensington, W.

The following candidate was balloted for and duly elected a member of the Society :—

Wilson, John Peter, 40, Addison-gardens North, Kensington, W.

The Paper read was—

OYSTER CULTURE.

By James Lowe, Esq., Joint Secretary of the Acclimatisation Society of Great Britain.

Oyster culture is the art of promoting the reproduction and improvement of oysters by artificial means. It is an art, because, although its processes are founded upon natural laws, the application of those laws is artificial; it is a method of cultivation, because it improves, both in quantity and quality, upon what is produced in a natural manner.

Oyster culture, like many very valuable arts, is an ancient one. I do not propose to occupy the time of the members by entering, at any very great length, into the history of oyster culture, as it was practised by the ancients, from whom it has been handed down to us in what is, apparently, a continuity of practice. This has been gone into very fully in the writings which the eminent French pisciculturist, M. Coste, has published on the subject, and from thence most of the information attainable as to that branch of the subject has filtrated into numerous essays and articles, which have appeared in periodicals and journals, both at home and abroad. There are, however, one or two points connected with the ancient knowledge and practice of the subject which are worthy of a passing notice.

There seems to be no record that oyster culture was practised by any people more ancient than the Romans. In the East, the birthplace of science, the oyster was not used as an article of food; and the teeming waters of the Indian ocean produced the pearl-bearing oysters and mussels in too great abundance to seem to require the aid of any artificial processes. The Romans were the first people to pay much attention to this bivalve, and they prized it highly as an article of food. The operations of Sergius Orata, that ingenious Roman who cultivated oysters in an artificial manner at Baiæ and along the shores of the Lucrine lake, have been often referred to; and I shall only allude to them for the purpose of pointing out the possibility that when Considius, the orator who was employed to prosecute him for trespassing upon the public right to the waters of the lake, said of him that he could cultivate oysters *in tegulis*, he may have alluded to the employment of roof-tiles as apparatus for collecting the spat. Some of the methods adopted by the Romans have been handed down without interruption by the inhabitants of the shores of the Lake Fusaro, where oyster culture is carried on to this day, and where the spat is collected upon piles driven into the ground, with boughs of trees interwoven and fascines of branches sunk to the bottom of the lake.

Some passages which Pliny the Elder wrote upon the habits and nature of the oyster, are exceedingly instructive, and it may be doubted whether the researches of modern cultivators have enabled them to add much to that which this eminent Roman naturalist tells us of the fish.

" Oysters love fresh water and spots where numerous rivers discharge themselves into the sea; hence it is that the pelagia are of so small size and so few in number. Still, however, we do find them breeding among rocks and in places far remote from the contact of fresh water, as in the neighbourhood of Grynium and of Myrina, for example. Generally speaking, they increase in size with the increase of the moon, as already stated by us when treating of the aquatic animals; but it is at the beginning of summer more particularly, and when the rays of the sun penetrate the shallow waters, that they are swollen with an abundance of milk. This, too, would appear to be the reason why they are so small when found out at sea; the opacity of the water tending to arrest their growth, and the moping consequent thereon producing a comparative indisposition for food.

" Oysters are of various colours; in Spain they are red, in Illyricum of a tawny hue, and at Circeii black, both n meat and shell. But in every country, those oysters are the most highly esteemed that are compact without being slimy from their secretions, and are remarkable more for their thickness than their breadth. They should never be taken in either muddy or sandy spots, but from a firm, hard bottom; the meat should be compressed, and not of a fleshy consistence; and the oyster should be free from fringed edges, and lying wholly in the cavity of the shell. Persons of experience in these matters add another characteristic; a fine purple thread, they say, should run round the margins of the beard, this being looked upon as a sign of superior quality, and obtaining for them their name of 'calliblephara.'

" Oysters are all the better for travelling and being removed to new waters: thus, for example, the oysters of Brundisium, it is thought, when fed in the waters of Avernus, both retain their own native juices and acquire the flavour of those of Lake Lucrinus. Thus much with reference to the meat of the oyster."

It is interesting to know that although the Roman epicures highly prized the oysters of the Mediterranean, reared and fattened in Lake Lucrinus, they cheerfully acknowledged the superiority of the British "native," as soon as the enterprise of their navy enabled them to enjoy that delicate bivalve. Juvenal makes mention of an epicure in oysters—a kind of Roman Dando—whose palate was so skilled that he could distinguish without any difficulty the oysters of one place from those which came from another. The British oysters most highly spoken of were those which came from Rutupium —the modern Richborough.

I shall not detain you with many arguments to prove the necessity for doing something to increase the productiveness of the oyster. The fact that this delicious and nutritious bivalve is rapidly becoming rarer and rarer, and the strong probability that, if unassisted, it must ere long become unknown as an article of food, has been of late years becoming more and more painfully apparent. This consequence is due to no sudden accident or unexpected cause. Fifteen years ago, the eminent French naturalist, M. de Quatrefages, drew the attention of the Académie des Sciences to the fact that " many beds of oysters, whose produce furnished the means of livelihood to the fishing populations of the shores of the Channel, have now become so impoverished that they have been abandoned."

Six years ago (that is to say in 1858), the gradual increase in the price of oysters in France, consequent upon the increasing scarcity of the fish, attracted the attention of M. Coste, the celebrated pisciculturist—the man who has perhaps done more for the good of his fellows (by pointing out the way to cultivate the water as the farmer cultivates the land) than any other man alive. It was high time indeed that something should be done; for the localities upon the shores of France once most celebrated for their abundant supply of oysters, were becoming totally destitute of the fish.

In February, 1858, M. Coste pointed out that the oyster-fishery was falling into such a state that, unless prompt measures were taken for its revival, it must ere long cease to exist. At Rochelle, Marennes, Rochefort, the Iles de Ré and Oléron, out of twenty-three beds which once formed part of the wealth of that coast, eighteen were entirely ruined, whilst those which still were productive to a certain extent were seriously injured by the increasing invasion of mussels. The Bay of St. Brieuc once had 15 beds of oysters in full activity, and 1,400 men, with 200 boats, were employed in dredging. In February, 1858 (when M. Coste reported upon the matter to the Emperor) there were only 20 boats and about 150 men. Thanks to the operations since carried out by M. Coste, at the expense of the State, the Bay of St. Brieuc is once more richly stocked; but at Cancale, a locality once celebrated for the quality and quantity of its oysters, and where nothing has yet been done to mend the mischief, things are now in a very bad way. Last August, I myself visited that place, and found a lamentable state of things.

Of three hundred boats which, but a few years ago, were actively employed in the oyster-dredging, not fifty could find full employment from that alone, nor, indeed, could more than an insignificant number be kept afloat were it not for the general fishing of the place. On the shore of the bay, where the oysters are laid out in *claires* and *étalages* to fatten and get into condition, I spoke with a man who been connected with the oyster trade for many years. He told me that the number of oysters dredged from the deep-sea beds in the neighbourhood, for use at Cancale during the current season, had then mounted up to little more than three millions seven hundred thousand, whereas twelve years ago, at the same period of the season, the total would be sixty millions. If I were to go on all night adding illustration to illustration in proof of the gradual disappearance of the oyster from localities where means are not being taken to allow nature fair play, I could give no better than this. In a word, at Cancale the dredgers have realized the old fable of "Killing the goose which laid the golden eggs."

For proof, however, of the gradual disappearance of the fish, need we seek much further than the oyster-shops of our own metropolis? The prices which the wholesale price of oysters in the market compels such dealers as Rule, Sweeting, and Pim, to charge us for our favourite supper or lunch, furnish the most home proof possible of the calamity which is a-head. Three years ago, the best native oysters were sold at forty shillings the bushel; they (that is to say, the Whitstables, which are the best) are now at seventy shillings. Burnhams, Black Rocks, Swansea, and the common sorts, are quoted at lower prices. When I mention that more than 150,000 bushels of oysters are brought to Billingsgate every year, some idea may be formed of the commercial importance of the oyster. To the consumer, this increase of price is very important. Most of us can remember, without carrying the memory very far back, a time when native oysters were sold for 4d. the dozen; more lately they were 6d.; then 8d., and at many first-class fishmongers 10d. is now demanded—indeed, at the wholesale prices which have to be paid by the dealers, I do not see how they can be sold for less. It is confidently stated that, unless something be done to assist nature in supplying the enormous demand made upon her resources, oysters will soon be a shilling the dozen. In St. Petersburgh and Moscow, where the British oyster is as much valued as it was in ancient Rome, and whither large numbers of our "natives" are sent, from three to four shillings per dozen is the price freely paid—so fond are the Russians of that delicious little bivalve which has been justly termed "the pearl of oysters."

Thanks to M. Coste and the able and zealous men who are working with him in the same direction, the oyster fisheries of France are in a fair way of being saved, and the cultivation of the oyster, which is now being carried on in various localities, has already reached an extent which will, no doubt, cause a very material addition to the natural wealth of the country. In the papers which I have written on the subject in the *Field* newspaper, I have given an account of the principal features of this vast national operation—the methods employed by M. Coste for refertilising the depopulated bay of St. Brieuc, the construction and management of the Imperial Oyster Park at Concarneau, and the operations on the shores of the Ile de Ré, where oyster-culture has indeed assumed magnificent proportions. I need not now recapitulate those interesting particulars; but I may state that, on the Ile de Ré alone there are now nearly 4,000 oyster parks, producing wealth and food upon what has hitherto been barren shore. A few passages from M. Coste's report on the subject, will serve to give an idea of what is being done there. It is dated Paris, 1861. He says:—

"The notion of cultivating the sea is no longer a doubtful promise on the part of science, which disparagement (that parasite inseparable from truth) can classify as a chimera, which it has done in turn by every great discovery which is now the glory of the human race. By entering into the minds of the populations of our shores, this idea has transformed the ocean into a food-manufactory, wherein industry may cultivate its harvest at its pleasure, so that, submitting organised nature to its influence, by a sovereign application of the laws of life it turns our shores into fields of plenty, capable of supplying all the markets of Europe.

"In the Ile de Ré, for example, more than 3,000 men, formerly disassociated from the tenure of the soil, have come from the interior to the shores to take possession of submerged lands, which the Government has conceded to them by lot, for the purpose of giving to each his particular interest in the common work. The courageous perseverance of this army of workers has given way neither before the necessity of clearing away the immense tracts of mud which for several leagues covered that sterile domain, nor before the difficulty of obtaining materials for the parks destined to bring it into a state of profitable cultivation

"They have detached, by blasting and the pick, the rocky ridges which bordered their island, and with the fragments they have constructed inclosures over the whole surface of the shore. Then within these inclosures they arranged stones vertically, and sufficiently near to each other, so that the retiring wave, broken by these obstacles, may be divided into rapid currents, and sweep the mud towards the point where, by inclined planes, it is conducted towards a kind of collecting sewer, and so conveyed out of the park. Every park thus arranged becomes, as it were, a cleansing apparatus, which the water converts into a productive field.

"There are already (this was in 1861) 1,500 of these parks in full work, arranged with the regularity of houses in a town, with broad roads for the use of vehicles and paths for foot passengers. These stretch from the Pointe de Rivedoux to the Pointe de Loix, a distance of nearly four French leagues, and covering a superficial surface of upwards of 750,000 square yards—a gigantic work, accomplished with a zeal unparalleled in the island. In addition to this, about 2,000 new parks are in the course of construction.

"Scarcely had the submerged lands which are the theatre of this marvellous conquest undergone the preparation necessary to cause them to bear fruit, when the seed, conducted thither by the currents, spread over them and covered every point of adhesion in incredible profusion. The fragments of rock which formed the walls of the parks, and those which had been placed within the spaces which those walls circumscribed, disappeared beneath the immense deposit of oysters—soon to become marketable, as the soil in our pastures is clothed by the ripe herbage which grows upon it. It is a fact, which everyone may verify at his pleasure, that when the sea leaves these inclosures dry, you may gather, with dry feet, the crop of shell-fish as readily as if you were picking fruit in a vineyard or kitchen garden.

"The local government agents estimate, as a mean, five hundred oysters to the square yard; and this calculation gives for all the parks in work a total of about 375,000,000 of oysters, representing a value of from six to eight millions of francs (£240,000 to £320,000 sterling)."

Before describing the methods of cultivation employed by these modern cultivators, a few statements as to the reproduction of the oyster will not be out of place. Until a very recent period, naturalists of eminence seem to have been in considerable doubt as to the sexual character of the oyster. In 1849, M. de Quatrefages announced it as his opinion that they were of two sexes; but, since then, M. Coste (who to the character of a zealous pisciculturist adds that of a careful and scientific embryologist) has determined, beyond all possibility of dispute, that this bivalve is hermaphrodite. The mode in which it reproduces is curious and interesting. In the month of May, the oyster gets into what is known as the milky state; this lasts until the month of August, and this is the season of spawning. For this reason, the oyster is said to be unfit to be eaten when there is an R in the month. When the oyster produces its eggs, it does not cast them forth, but keeps them adhering to the outer folds of its shell, as the lobster does. A well-grown oyster will produce an immense quantity of eggs, which have been estimated to number from one to two millions. I am not aware how this calculation has been verified, but it is accepted as true by experienced observers. During incubation, these eggs cling to the laminæ of the shell, where they lie covered by a mucous cloak, which changes in colour from cream colour to transparent yellow; it then becomes opaque, and finally degenerates into a grayish-brown, or very deep violet grey. The mass hardens, and remains firmly fixed upon the shell, until the mother, by an effort, throws off this progeny from her sides. The appearance of these myriads of embryos, as they are violently ejected through the water, has been described as "a cloud of spawn."

Now, under ordinary circumstances, when this operation takes place in a deep-sea oyster-bed, the chance of each individual embryo surviving and growing up to respectable oysterhood is very remote indeed. Carried away by the currents or by floating weeds, choked in mud, ground to pieces by rolling shingle, or devoured in myriads by the infinite variety of creatures who pasture upon such food, all but a very few perish. How many survive out of the one or two millions can scarcely be told. Some say five or six; others, more sanguine, say twenty. For my part, I do not see how it is possible to arrive at any fixed proportion; much must depend upon circumstances. At any rate, whatever the number may be, it is evidently very small in proportion to the production; and we may safely suppose that the extraordinary fecundity of the oyster is not without its use, when we find that out of millions produced under ordinary circumstances, only units survive. To protect these embryos; to give them opportunities of fixing themselves, to secure points of adhesion, where they may grow and fatten, and become wholesome food at their leisure, protected from waves, shingle, mud, natural enemies, and all other dangers which threaten them; such are the objects of oyster-culture. I shall now proceed to describe the means whereby this is effected.

When the young and undeveloped oyster quits the fold of the parental shell, it is provided for the time with an apparatus for swimming. This is a kind of pad or cushion, covered thickly with cilia, and furnished with powerful muscles, which enable it to expand or contract. By means of this apparatus it swims about, until it can find something to attach itself to. When the young oyster has fixed itself in the place whereit is to grow and becomes stationary, the pad, being thenceforth useless, dwindles away little by little and finally disappears. When the oyster first attaches itself it is scarcely so big as that popular standard of measure a pin's point, but it soon begins to grow. I cannot give you a better idea of the rapidity of its growth than by a drawing of a piece of wood with oysters of various sizes attached. I have to thank M. Coste for copies of the beautiful engravings from which these photographs were taken by Mr. Poulton. They are printed in his magnificent "Voyage d'Exploration sur le Littoral de la France;" and, by the liberality of the Imperial Minister of Agriculture, at the instance of M. Coste, copies of the blocks have been furnished to me from the Imprimerie Impériale. The rapidity with which oysters reach maturity depends very much upon the locality in which they are bred. In the best places, that is to say, with everything in their favour, they will attain to the dignity of being eatable in eighteen months; in places unfavourable to their growth they will be six years in attaining this state. The medium period is three years, and this is the time required for oysters in places moderately favourable to their development. The age of an oyster is calculable by the number of laminæ in his shell. As old Pliny tells us, "they increase with the moon," and every month (possibly by some strange sympathy between the creature and the tides) is marked by an extension of the edge of the shell, the laminæ of which sprout forth in a delicate translucent fringe, as the creature renovates, expands and extends its calcareous mantle by deposits inside the shell. The French call this the beard of the shell, and also *la croissance d'une lune.*

The artificial cultivation of the oyster, as it is now practised by the French cultivators, is carried on upon the foreshores—that part of the shore that lies between high and low water mark. The shore is divided into separate allotments by low walls, built of rough stone or shingle, which have no other purpose than to divide the allotments. Each allotment is called a park, a term which has been applied in the British oyster fisheries to portions of the foreshores where oysters are laid down to fatten for the market. The parks of the French cultivators are, however, provided with apparatus for collecting the spat or spawn, which I shall presently describe. In addition to these *parcs* the French oyster-culturists have *étalages,* which answer to the English parks, places on the foreshore where oysters are laid down to fatten and get ready for the market. A *claire* is an enclosure, constructed on the upper part of the foreshore, with low walls, sufficiently water-tight to keep a few inches of water over the oysters. A *vivier* is a tidal pond, in which the water can be renewed twice a day, and where oysters or any other kind of fish can be stored. If I were to attempt any description of the circumstances most favourable for these various arrangements, it would require more time than you could spare. It will be sufficient to state that a firm, sheltered shore, free from weeds and mussels, and with just a little, but not too much mud, is best fitted for an oyster park. For getting oysters into condition a contribution of fresh water from a rivulet or stream, so as to make the salt water brackish, is to be recommended.

I now come to the various kinds of collecting apparatus used by the French cultivators. For large operations, in a considerable depth of water, like that which M. Coste carried out so successfully when he restocked the Bay of Brieuc, nothing is better than large fascines of branches bound together with a thin chain of galvanised iron, and sunk by means of a heavy stone. Upon these branches, when the weed is not too abundant, the spat collects in abundance, and I have seen branches covered with this novel efflorescence which might not inaptly be compared to the Maythorn in blossom. For the parks upon the foreshore other means are adopted. The most cumbrous of these is the collecting-floor—a construction of piles and planks, under which the mother oysters are laid, and which receive the spat upon the under-surfaces of the planks. These floors, however, can only be of use in very exceptional situations; and as a means of efficient working in a park they are not to be compared for one moment with the collecting-tile, especially those which have been invented by Dr. Kemmerer, the able and zealous oyster-culturist of the Ile de Ré.

I pass over the collecting-boxes or hives, which have also been superseded by Dr. Kemmerer's inventions, and come at once to the collecting-tiles. They are the common roof-tiles to which I alluded when I said it was possible that Sergius Orata used them in his ostreocultural operations. They are used plain, or covered with cement on the inner side, with shells embedded in the cement, or small faggots suspended there by means of galvanised wire. The great advantages of these tiles are that they are cheap, easily replaced, and easy to manage. They can be arranged in the manner best suited to the peculiarities of the locality, either by supporting them on posts or poles, to keep them out of the mud, or by ranging them against each other, or by piling them in the form considered best. Their business is to offer to the spawn, at the time when it is floating about, a fit resting-place to fix itself upon, and attain years of maturity. Not the least of their merits is that they may be marked, so as to be identified easily. Here are specimens of various kinds. The plain tile, marked with the letter O, as a badge of ownership; the cemented tile; the shell tile; and the faggot tile. The great advantage which tiles, and especially cemented or otherwise prepared tiles, have over any other mode of collection, is that they are so thoroughly manageable, and that they enable the collector to remove the oysters as soon as they are large enough, and lay them flat in the *étalage* to grow shapely. Perhaps the worst kind of collecting apparatus is a piece of stone. It is not so easy to chip an oyster off a piece of granite when it has distorted itself to become accommodated to the irregular formation of the stone. A specimen which I shall now show you will serve to give some idea how inconvenient it is when the young oysters deform themselves by crowding and clinging to granite rock.

Take, on the other hand, this specimen of a collecting tile, the inner surface of which is covered with oysters, some of them of more than a year's growth. This tile I picked up myself in the imperial oyster-park of La Forêt, near Concarneau, a place remarkably well fitted for the cultivation of the oyster. It will be observed that the oysters here are much better as regards shapeliness, than those upon the granite stone. I cannot, however, find a better way of enlightening you as to the application of these tiles than by reading to you the specification which Dr. Kemmerer, of the Ile de Ré (the oyster cultivator who seems to have had this branch of the subject under his special charge) has lately registered in our patent office. This specification contains, moreover, in a very succinct form, much valuable information as to the working of oyster parks.

"Oyster spawn, on its injection from the parent oyster, swims or floats in the sea, and is only preserved from destruction by meeting with some body or bodies to which it can adhere. "Cultch" is the term in use for such bodies. As soon as it attaches itself to any surface, or is of a size to be readily seen by the naked eye, oyster spawn is distinguished by the name of "spat." In the course of time the spat increases in size, and, passing through its intermediate stages, becomes oysters. But in order to acquire the characters preferred by consumers it must be detached from the bodies to which it has adhered when still young, and placed on beds or layings known to possess fattening properties. When left to nature, however, young oysters are found spontaneously to grow on the cultch to which they are fixed.

"My invention consists of contrivances calculated to meet these requirements, to which I give the name of oyster spat collectors. For this purpose I employ, by preference, tiles of the form of the ridge-tiles in use for roofing purposes, and made of common potter's clay or other suitable materials. The dimensions which answer best are a breadth of seven or nine inches, with a length somewhat exceeding two or three diameters, as, for instance, 24 inches long by 9 broad. I recommend the above form and sizes as being calculated to afford a good lodgment for the young oysters, and as being convenient to handle and arrange compactly and solidly in groups, but do not confine myself to such, any other size or shape being capable of securing, to some extent, the object in view. Although tiles are perhaps the best materials that can be used for oyster spat collectors, I do not limit myself to them, but in certain circumstances employ stones, bricks, slates earthenware, cement, "compo," glass, metal, wood, papier maché, wicker-work, felt matting, rope, cork, or other material to which can be applied the facing or lining specified in the following description, which is made specially applicable to concave tiles, as being the type and most perfect form of my collectors.

"Having reduced some common clay to the consistence of thick cream, by working it up with water, I coat, by means of a brush or otherwise, the hollow surface of the tiles to be used with this mixture, leaving untouched a small margin on each side or at the corners. I then prepare, in quantity sufficient to be all worked off at one time before setting, a cement capable of resisting the action of the water when submerged by the sea, such, for instance, as Portland cement, which, by experience, I have found to be the best for the purpose. Upon the prepared surface of the tile I throw a trowelful of cement, and with the help of a wooden or other mould of the same curve as the tile, and filling its concave side, spread it rapidly over the surface as as to form a facing or lining of $\frac{1}{8}$ to $\frac{1}{4}$ of an inch, or thereabout, in thickness. The free margins of the tile permit the layer of cement to attach itself firmly to it, while in the central portion the interposed coating of clay, by preventing adhesion, causes it to be easily detached.

"At or just before the period of the year when oysters begin to spawn, I place the collectors so prepared in situations chosen for the operation of collecting oyster spat, and where, if necessary, parent oysters have been previously laid, depositing the latter under or among them or in their immediate vicinity. When the foreshore is the situation selected, the part which gives the best result, the ground being of the right sort, is that which lies between low water of neap and that of spring tides.

"Previously to the time of year when frost is to be feared, the collectors, unless so situated as never to be entirely uncovered with water nor subject to 'freshes,' must be removed and treated according to the nature of the layings prepared for the future growth of the oyster brood. They may either be placed during the winter entire with their adherent crop of spat in suitable layings, or else the spat may be detached and transferred separately to the layings. If not undertaken before the setting in of winter, the latter operation must be performed subsequently. A very favourable time is when the young are about fourteen or fifteen months old. At whatever period it is done, all that is required is to remove the cement facing, and then to break it in pieces, according to the number of young present. Where but little spat has adhered to the collectors it will be found an economy, instead of detaching the entire facing, merely to gouge off what there is, and the following year to refresh the surface by means of a coat of thin cement applied with a brush."

In an interesting pamphlet, which he has written upon this subject, entitled "Des Ruches Tuilées et de la Culture des Huitres, sous le Rapport Commercial," Dr. Kemmerer recommends the admixture of defibrinated blood with the cement with which the tiles are to be coated. As this is chiefly albumen, I imagine that this was adopted in the expectation of attracting the young oysters to the spot, by offering them food already provided in their place of lodgment—an expectation which gave them the credit for being able to exercise a power of selection. As I observe, however, that he has not mentioned the defibrinated blood in this specification, I may fairly assume that he has discarded it as useless. It will be observed also that Dr. Kemmerer makes use of papier maché, among other materials; and in his pamphlet he recommends the employment of hydraulic limes, and cements of peculiar manufacture, not easily to be obtained in this country. In dealing with these, however, the British oyster cultivator will do well to consider, not the exact letter of Dr. Kemmerer's directions, but their spirit. Let him consider what he has to do. He has to provide an apparatus which can be obtained in large quantities and at small cost; something which can be easily carried about and arranged in the manner best suited to the peculiarities of the shore, and will yet resist the action of the waves, both by its weight and durability; something, moreover, which will present rough surfaces of adhesion to the young spawn, and yet allow the growing oyster to be easily detached without injury to the shell; something that will keep the oyster from the mud, and admit of the free passage of the ebbing and flowing water along the surface of the shore. The apparatus which best unites all these qualifications is, as far as I am at present aware, the collecting tile; but it is for every cultivator to judge for himself; and if he can employ means which present all these advantages as fully as the collecting tile, there can be no reason why he should not employ them. Dr. Kemmerer is constantly improving the tile. In fact, to quote the words of M. le Docteur Gerbe, an able assistant of M. Coste in his patriotic labours, and whom I had the pleasure of meeting at Concarneau, "We have to seek and seek; the best mode of collecting the spat has yet to be discovered."

You will have observed that Dr. Kemmerer advises that the hollow side of the tile should be coated with cement, and, generally speaking, it is to that side that the oysters attach themselves. The little streams and currents into which the tide is broken by the irregularities of the shore, carry the spat about, and if the tiles be resting upon their edges, these currents flow under the hollow parts and deposit the spawn upon the inner surface. In communities of oysters there are, however, nearly as many instances of eccentricity as among communities of mankind, and it occasionally happens that the upper and not the under surface is chosen. Here is a remarkably fine and crowded example of this, which was picked up among the oyster parks of the Ile de Ré by Mr. Mitchell, the secretary of the Fish and Oyster Breeding Company, and kindly presented by him to me.

In quitting this branch of the subject, I would call attention to the bearing which this method of promoting the reproduction of oysters upon the shores is likely to have upon the condition of the deep-sea beds. It seems clear that the gradual disappearance of the oysters of late years is due to impoverishment of the natural beds by over-dredging. Captain de Saumarez, of her Majesty's steamer *Dasher*, told me that a few years ago, when surveying between Jersey, Alderney, and the Coast of France, he came upon a large bed of natural oysters lying in the bottom of the Channel, more than three miles in length, and of considerable breadth. The news soon spread, and in a very short time (such was the rapacity of the oyster-dredgers) not an oyster was left to tell the tale. Now, it is likely that by establishing oyster-breeding in all available parts of the foreshores, the quantity of spawn will become so enormous that the deep-sea beds will be benefited by it. The perils which an individual embryo must be exposed to in its journey from the coast to "full fathom five" at the bottom of the Channel, must, of course, be formidable and numerous; but when we recollect that each mother-oyster throws forth such embryos by millions, it can scarcely be that so much spawn can be produced without vast quantities being carried away by the water and deposited safely at the bottom of the sea. This, indeed, is the opinion of M. Coste, who points to the alienation of the foreshores for this purpose as the most certain means of renovating the deep-sea beds.

It is highly probable that these artificial methods of propromoting the propagation and protecting the spawn might be applied with effect to other shell-fish than oysters. Whilst I was writing this paper I received a letter from the Right Hon. Edward Cardwell, Her Majesty's Secretary of State for the Colonies, to the effect that the Pearl Fishery at Ceylon had entirely failed this year, and asking for information that might be of service to the Ceylon government as to the cultivation or preservation of the pearl oyster. Now I need not tell most of you that the pearl oyster is not an oyster at all. It belongs to the order *Aviculidæ*, and is one of the wing-shells. It throws out a byssus, like the mussel, whereby it attaches itself to other shells or stones. The letter of Mr. Cardwell was accompanied by a copy of a despatch from Acting-Governor O'Brien to the Duke of Newcastle, stating full particulars of the surveys made and the observations taken. I cannot, of course, detail them here. I may mention, however, that the circumstances were sufficiently desperate to warrant the Ceylonese government in putting a stop to all preparations for the fishery; and the acting-governor adds that he is afraid "that there is no prospect of a fishery for some years." Now, it would be very presumptuous in me to offer any very decided opinion as to the cause of the failure of the Ceylon fishery, in the face of the fact that these suspensions and failures of the fishery have occurred before, and have occupied the serious attention of eminent and intelligent men, who have enjoyed ample opportunities of investigation without coming to any certain conclusion as to the cause of the mischief; but on reviewing the circumstances of the case as described in the acting-governor's despatch, it appeared to me probable that the calamity was due, not to one cause only, but to a combination of causes, and that here was a case where the artificial processes of the oyster-cultivators might be applied almost with the certainty of success. Mr. Mitchell (who has studied this subject of oyster-culture to as good effect as any man in this country) entirely agrees with me in this, and feels certain that, without in any way encroaching on the ancient pearl-oyster banks, the multiplication of the bivalve that produces the pearl might be secured in Ceylon if the Government would grant the use of the foreshore, in certain parts of the island, for the establishment of artificial beds in which the principles of marine pisciculture could be effectually applied. The pearl-oyster (or rather mussel) is a shell-fish, which is able to exist and thrive on ebb-dry foreshores, and its means of attaching itself to the soil are such as to render it easier of control than the edible oyster. If an experiment of this kind were successful, the artificial system of cultivation might afford the means of introducing the pearl-oyster to many parts of India besides where it is at present found.

After Mr. Mitchell and myself had come to this opinion, it struck me that I should do well to turn to Sir Emerson Tennent's valuable work on the "Natural History of Ceylon," and on doing so, I find that he recommends precisely the same remedy. Sir Emerson Tennent gives a most interesting account of the pearl fishery and of what was known and surmised as to the cause of its occasional failure. He says:—

"A trade more ancient by far than that carried on in chanks, and infinitely more renowned, is the fishery of pearls on the west coast of Ceylon, bordering the Gulf of Manaar. No scene in Ceylon presents so dreary an aspect as the long sweep of desolate shore to which, from time immemorial, adventurers have resorted from the uttermost ends of the earth in search of the precious pearls for which this gulf is renowned. On approaching it from sea the only perceptible landmark is a building erected by Lord Guildford, as a temporary residence for the Governor, and known by the name of the "Doric," from the style of its architecture. A few cocoa-nut palms appear next above the low sandy beach, and presently are discovered the scattered houses which form the villages of Aripo and Condatchy.

"Between these two places, or rather between the Kalaar and Arrive river, the shore is raised to a height of many feet, by enormous mounds of shells, the accumulations of ages, the millions of oysters, robbed of their pearls, having been year after year flung into heaps, that extend for a distance of many miles.

"During the progress of a pearl-fishery, this singular and dreary expanse becomes suddenly enlivened by the crowds who congregate from distant parts of India; a town is improvised by the construction of temporary dwellings, huts of timber and cajans, with tents of palm leaves or canvas; and bazaars spring up, to feed the multitude on land, as well as the seamen and divers in the fleets of boats that cover the bay.

"I visited the pearl banks officially in 1848, in company with Capt. Steuart, the official inspector. My immediate object was to inquire into the causes of the suspension of the fisheries, and to ascertain the probability of reviving a source of revenue, the gross receipts from which had failed for several years to defray the cost of conservancy. In fact, between 1837 and 1854, the pearl banks were an annual charge, instead of producing an annual income, to the colony. The conjecture, hastily adopted, to account for the disappearance of mature shells, had reference to mechanical causes; the received hypothesis being that the young broods had been swept off their accustomed feeding grounds, by the establishment of unusual currents, occasioned by deepening the narrow passage between Ceylon and India at Paumbam. It was also suggested, that a previous Governor, in his eagerness to replenish the colonial treasury, had so "scraped" and impoverished the beds as to exterminate the oysters. To me, neither of these suppositions appeared worthy of acceptance; for in the frequent disruptions of Adam's Bridge, there was ample evidence that the currents in the Gulf of Manaar had been changed at former times without destroying the pearl beds; and moreover the oysters had disappeared on many former occasions, without any imputation of improper management on the part of the conservators; and returned after much longer intervals of absence than that which fell under my notice, and which was then creating serious apprehension in the colony.

"A similar interruption had been experienced between 1820 and 1828: the Dutch had had no fishing for twenty-seven years, from 1768 till 1796; and they had been equally successful from 1732 till 1746. The Arabs were well acquainted with similar vicissitudes, and Albyrouni (a contemporary of Avicenna), who served under Mahmoud of Ghuznee, and wrote in the eleventh century, says that the pearl fishery, which existed in the Gulf of Serendib, had become exhausted in his time, simultaneously with the appearance of a fishery at Sofala, in the country of the Zends, where pearls were unknown before; and hence, he says, arose the conjecture that the pearl oyster of Serendib had migrated to Sofala.

"It appeared to me that the explanation of the phenomenon was to be sought, not merely in external causes, but also in the instincts and faculties of the animals themselves, and, on my return to Colombo, I ventured to renew a recommendation which had been made years before, that a scientific inspector should be appointed to study the habits and the natural history of the pearl-oyster, and that his investigations should be facilitated by the means at the disposal of the Government.

"Dr. Kelaart was appointed to this office, by Sir H. G. Ward, in 1857, and his researches speedily developed results of great interest. In opposition to the received opinion that the pearl-oyster is incapable of voluntary movement, and unable of itself to quit the place to which it is originally attached, he demonstrated, not only that it possesses locomotive powers, but also that their exercise is indispensable to its economy when obliged to search for food, or compelled to escape from local impurities. He showed that, for this purpose, it can sever its byssus, and re-form it at pleasure, so as to migrate and moor itself in favourable situations. The establishment of this important fact may tend to solve the mystery of the occasional disappearance of the oyster; and if coupled with the further discovery that it is susceptible of translation from place to place, and even from salt to brackish water, it seems reasonable to expect that beds may be formed with advantage in positions suitable for its growth and protection. Thus, like the edible oyster of our own shores, the pearl-oyster may be brought within the domain of pisciculture, and banks may be created in suitable places, just as the southern shores of France are now being colonised with oysters, under the direction of M. Coste. The operation of sowing the sea with pearl, should the experiment succeed, would be as gorgeous in reality as it is grand in conception; and the wealth of Ceylon, in her 'treasures of the deep,' might eclipse the renown of her gems when she merited the title of the 'Island of Rubies.'"

How far the conclusions of Dr. Kelaart, as to the migratory powers of the pearl oyster, are accurate, I cannot tell; but I am rejoiced to find the opinion of so careful an observer as Sir Emerson Tennent, as to the applicability of oyster-culture to the renovation of this important fishery tally so exactly with my own.

Little remains for me to do but to lay before you a few considerations, as to the practicability of applying the processes of the French cultivators to the renovation of our own oyster fisheries, and of thus rendering this delicious and popular article of food more plentiful, and conquently cheaper, than it ever was. Of course we shall have plenty of objections started. A keen observer of human nature, who has had great experience of mankind, and has seen "men in nations," has declared that whereas it is the faculty of the oriental mind to consider a proposition newly put before it, with the view to discover what of good there is in it, it is the faculty of the occidental mind to object. Now objections on the part of those who are in possession of the oyster-fisheries which already exist may be expected; it is in the nature of things that these should prefer to keep their business to themselves rather than see it thrown open. These will tell us that it is only in certain localities and amid certain conditions that the native oyster can attain its much-prized perfection of plumpness. That is very possibly so; but I believe those localities to be much more numerous than those which are now used for the purpose of oyster-culture. It is is even possible that there are some spots where the conditions necessary to perfection exist in so happy and special a manner that the oyster may attain in them a degree of excellence not attainable in other less fortunate places. What then? Is it not exactly the same with the grape vine? And is the multitude, who can only afford pence for its luxuries, to be debarred from good sound *ordinaire*, because the wealthy can sip Clos de Vougeot and the Prince Metternich's Cabinet at the cost of pounds? In illustration of the peculiar circumstances which may affect the condition of oysters, I may mention that the excellence of the Pandore oysters, so prized by the Edinburgh *gourmets*, is attributed to the refuse of the Preston-pans breweries, which finds its way into the sea near their layings.

But a still more dangerous class of objectors are those who, in scientific garb, start objections which are not supported by the truths of science. Since propositions have been afoot for applying the processes of the French oyster cultivators to the enrichment of our foreshores, much has been said about frost and the Gulf-stream, and it has been objected that although these processes may do very well in the Bay of Biscay, where there is no frost and where there is the Gulf-stream, they may not answer so well here where the conditions are reversed. Now, in reply to this, I have to say that there is frost in the Bay of Biscay, and that the effect of the Gulf-stream is no more appreciable there than it is upon our own coasts, especially the coast of Ireland. Whether there is such a thing as the Gulf-stream at all, whether it is possible for a stream of hot water to find its way across the wide Atlantic, preserving throughout the journey its individuality amid the colder ocean through which it flows, is a question I must leave to the decision of abler men than myself, but at any rate those who believe in the existence of this stream have always given the shores of Ireland credit for participating in its benefits quite as much as any other part of Europe, and I have had the satisfaction of hearing Mr. Ffennell, the Government Commissioner of Fisheries, express his conviction that the processes of oyster culture will succeed in England, and that they could not fail to be in the highest degree beneficial if applied upon the Irish coast; for he knew of miles upon miles of shore which might be converted from literally desert sands into fields of smiling plenty. I also am convinced that on the shores of England, and especially in the mouths of our great rivers, and on the east coast northward from the mouth of the Thames, there are large tracts which only require enterprise and capital to become manufactories of food and nurseries of wealth.

Already, several enterprises of this kind have been undertaken. With the view of putting to the test of actual trial the French system of artificial oyster culture, the "Fish and Oyster Breeding Company" have acquired the use of a portion of the oyster layings belonging to Mr. Scratton, of Prittlewell, which are situated on the foreshore to the west of the pier at Southend. Here they have laid down about 1,500 bushels of full-grown oysters, which have been spread over about five acres of space, in such a way as to leave room for the placing of 50,000 of Kemmerer's collectors, which are at the present time being prepared under his patent. If each collector on an average catches but ten spats, the crop secured in one year will amount to 500,000 oysters, the value of which will be £1,000.

Having made arrangements with an adjoining proprietor for the use of a series of fish pits, originally constructed as vivaria for the keeping alive of flat fish for market previously to the construction of railroads, and containing each about 400 superficial surface of water, this company intend setting apart some of them for experiments in the rearing of oysters in *claires*, on the system so successfully produced on the west coast of France, and devoting others to experiments with young salmon, whitebait, flat fish, and eels, all of which, there is reason to think, can with profit be grown for sale in confinement. They thus hope not only to have immediately in working order an establishment situate within an easy distance of London, calculated to form a centre of practical information on the subject of marine pisciculture, but to be able to demonstrate the profitable nature of such undertakings by the division of respectable dividends.

This undertaking if properly carried out (as I have little doubt it will be under the able superintendence of Mr. Mitchell), can scarcely fail of success. There is also another company about to begin operations at Herne Bay, in which my coadjutor, Mr. Buckland, is interested, a circumstance which of itself is a warrant of success.

Into the legal branch of the question I do not propose to enter very deeply. I am aware that there are legal difficulties in the way of oyster-culture not inconsiderable, but difficulties in the way of a laudable enterprise are only incentives to work harder in bringing it about. The right of the crown to the foreshores is an ancient one, and it is necessary to the proper defence of our seaboard. I have no doubt, however, that in all localities proper for their cultivation, and upon good reason being shown, the crown would be advised to cede that right under limitations, and Parliament may be induced to give a right of private property to oyster cultivators in the parks which they construct, and all contained in them. The greater part, if not all the oyster fisheries which at present exist upon our coasts, have their rights founded upon royal charters. It is worthy of notice that in the little island of Guernsey the same difficulties existed, but they are nearly if not quite overcome. Three years ago, visiting that interesting and beautiful ocean gem, I noticed in some of the bays which skirt the island what appeared to me to be a particular aptitude for oyster cultivation. Some gentlemen of the island to whom I spoke about the matter determined to take the idea up and work it to profit, and they have since been organising their plans. It was found, however, that before they could set to work they must obtain the consent of the Queen, who claimed the foreshores, not as Queen of England, but as Duchess of Normandy; and that they must then go to the States of the island, and ask them to make such an alteration in the laws of the island as would make it a larceny for anyone to steal oysters from a park laid out upon what has hitherto been considered open shore. These were formidable difficulties to overcome, especially the last; but that they have been overcome I have good warrant, for only the other day I received a letter, dated the 25th of April, from Dr. Hoskins (a Fellow of the Royal Society, an eminent meteorologist, who has for nearly a quarter of a century recorded and digested the meteorological phenomena of the Channel, the honorary secretary of the Acclimatisation Society of Guernsey, and my very good friend), in which he says:—"You will be glad to hear that oyster-culture is being taken up very earnestly by our people, and that several companies are already formed, and have obtained grants of beach in some of the bays." I am very glad indeed to hear it, for (unless I am very much mistaken) I perceive in this movement the germ of prosperity in the future, and I am in hopes of living to receive an annual barrel of Guernsey oysters, as a testimonial, for having been fortunate enough to be the first to point out the capabilities of the island.

It now becomes my pleasing duty to thank you very gratefully for having listened to what I have had to say. Much that I have told you is taken from other and abler observers, but if I have had it in my power to add anything from my own opportunities of observation to what they have recorded, it is an achievement of which I shall always have reason to be proud. It may be an old art (as I commenced by stating), but in this country it is a new one, and I, for my part, shall feel amply repaid for any trouble I may have taken in the matter, by the sense that I have been instrumental in a movement so fraught with benefit to my fellow-creatures, and proud am I at being permitted to march in this great movement shoulder to shoulder with Coste, Kemmerer, Mitchell, and other zealous oyster-cultivators—not as generals of the army, but as pioneers. It was once said that that man who made two blades of grass grow where one grew before, deserved better of his country than the conqueror of armies. How much more will they deserve who grow food where none ever was before?

To cultivate the sea; to till and sow the shore like a corn-field; to cover the salt sand with rich and nutritious crops; this will be an achievement indeed! And that it is not an impossible one, the example of what has been done upon the French coast gives us sure and certain proof. Let us set about it.

As an incentive to this work, I will show you just one picture more. It is a view of the Bay of La Tremblade, in the Ile de Ré, the foreshore of which is covered with oyster-parks. The water is down, and allows us to see the walls of enclosure, and here are the poles driven into the shore, which show the lines of demarcation between the several properties. Some peasants are working at these parks, and here sits Dr. Kemmerer, the zealous oyster-cultivator, surveying, with an air of pleased satisfaction, the glorious scene of plenty which he and those who have worked with him have evoked as it were out of the desert. Who does not envy his feelings?

DISCUSSION.

Mr. FFENNELL (Government Inspector of Fisheries) thought those who came forward to promote the cultivation of the oyster deserved the gratitude of the country. There was at present a great deficiency in the supply; there were, however, abundant means of producing large supplies, and it only required energy and knowledge to accomplish this work of great national importance. Mr. Lowe had referred to him, in his paper, as having stated that there were large portions of the coast in Ireland adapted to the cultivation of oysters. Of that there could be no doubt. It was not a mere matter of speculation, because on many occasions, by accident as it were, oysters had grown up where they were never known to grow before, and had those places been sought out and carefully cultivated, large supplies might have been obtained long ago. As an illustration of this, he would mention that there were now, and had been for many years, valuable oyster beds in the Cork river, a little higher up than the harbour; these had been established as a private property, and the origin of these beds was this:—A vessel freighted with oysters for the Cork market, having anchored in the river, was detained so long by the low tides that the oysters, which were supposed to have perished, were thrown overboard; but they were not quite dead, and from that circumstance there sprung up a very large supply. It was clear that many places might be found equally favourable for oyster-culture, where oysters might be bred. He regarded the movement made in this direction in this country as most laudable, and he regretted that opposition had been raised by the public press to some of them. There was room enough for all, and there should be no jealousy about the matter. Even on that very day he had read in a newspaper something about depriving the poor people on the Kentish coast of their means of livelihood by taking possession of certain oyster grounds they enjoyed. There never was a more unfounded charge, because, in fact, the poor people alluded to had nothing to lose in that respect. The place had been denuded of oysters, and the re-stocking of those grounds by private enterprise would lead to a vast amount of employment being given to the poor which they could not obtain at present. It seemed that this movement, like most other new things, was subject to a foolish, and he must say, mischievous opposition; and he trusted every thinking person would aid in promoting projects like these, which were calculated to supply a large amount of food to the community, and thus to add to the wealth of the country, as well as afford employment to large numbers of people. There was one place in Ireland which, some years ago, gave employment to some 2,000 people in the culture and collection of oysters. The beds there were worked to such an extent that the mere freight in one week often amounted to £1,000; but so recklessly were the beds worked that their entire produce at the present time did not amount to £300 per annum. The beds were completely destroyed, and the few people who remained in their vicinity only obtained a miserable pittance out of them, and any person seeking to cultivate these grounds as private property, by means of which employment could be given to 2,000 or 3,000 people, would, in fact, be a public benefactor. He believed that no adequate progress could be made in this important movement unless power was given to parties who had the skill and enterprise to engage in this operation, to establish a private property in oyster beds.

Mr. **Frank Buckland** was sure they must all admire the earnest spirit in which Mr. Lowe had brought this subject before their notice. Not long ago he (Mr. Buckland) had the pleasure of stating, in this room, what was doing in the way of the artificial propagation of salmon and trout, whose spawn was counted by thousands, but the oyster yielded millions. He had begged them to take the trout and salmon in hand. Mr. Lowe asked them to do the same with regard to the oyster. Gentlemen present, engaged in the oyster trade, could testify to the amazingly prolific character of the oyster, and its cultivation promised to be highly profitable. This year, owing to the early arrival of hot weather, oysters had begun to spat earlier than usual. Generally they did not spat before the 9th of June, but this year the warmth of the weather, which was killing his young salmon fry, had occasioned the earlier spatting of oysters. The great point, as had been urged by Mr. Lowe this evening, was to preserve the oyster brood from being swallowed up by sandbanks, &c.; the young oyster only wanted something to stick to, and this was all we need supply him with. Looking to the comparatively small per-centage of brood that come to perfection, it was amazing that so long a time should have been allowed to elapse without some artificial means being adopted, founded upon nature's own laws, for the cultivation of an article of food, which was now supplied in very inadequate quantity, and at a greatly-enhanced and annually-increasing price. With regard to the pearl fishery, that was a different matter altogether. The pearl-oyster in Ceylon had been destroyed from a cause beyond the control of man. He had been informed on good authority that a peculiar kind of skate fish had made an attack upon the pearl-oysters, and had nearly eaten them all up, and he believed that was the principal reason of the failure of the pearl-fisheries this year; but there was no reason why the pearl-oyster should not be cultivated in India, as he hoped to see done with the other species of bivalve in this country. The great thing to be considered in the cultivation of the oyster was temperature. With the thermometer at 70° salmon fry died, but oysters flourished. There were parts of the coast of England that were within the influence of the great Gulf-stream, and these were well adapted with regard to temperature for the breeding and cultivation of oysters. On the west coast and on some portions of the east coast there were places well adapted for the establishment of breeding and feeding grounds for oysters, but he did not expect to hear of oysters being cultivated on the coast of Northumberland. This might, however, be done on the west coast of Scotland, and even at no great distance from the mouth of the Thames: but he would impress upon them that the great thing in the breeding of oysters was high temperature. A low temperature was fatal to the oyster brood, and they died immediately. As nature had shown them what to do, why not elevate the temperature to suit the little oysters? They packed salmon eggs in ice to retard their development when sending them out to Australia: on the same principle, he said, they should apply heat to the oysters and make them spat.

Mr. **Mitchell** said he represented a body of gentlemen who had taken great interest in this subject, and who, without appealing to the public, and without any Act of Parliament, expected in a few months to put this matter to the test. They had seen what had been done in this direction in France, and they hoped to do at least as well in this country. With Mr. Ashworth's salmon-hatching apparatus he expected better results in the cultivation of that fish than had been obtained in France, for though the idea of salmon-culture chiefly originated in that country, yet the practical carrying of it out had been much retarded there, but Mr. Ashworth had met with considerable success. He hoped to see good results arise from the operations in oyster-culture which had been commenced in the vicinity of Southend.

Mr. **Ridley** (of Ipswich) requested Mr. Lowe to favour him with some further particulars as to the formation of the oyster parks on the French coast. It appeared that the oysters were covered with water at high tide, and he should be glad to learn what was the average depth of water at extreme low tide, also what height the walls should be made, and further, whether Mr. Lowe had seen any attempts made to propagate oysters in enclosures of salt water by the side of a river. As one of those connected with the management of the river at Ipswich, he might mention some experiments in oyster-breeding that had been made in an enclosure of salt-water, originally constructed as a bathing-place, a short distance from the town of Ipswich, and 11 miles from the sea. The depth of the enclosure nearest the channel was 10 or 12 feet, and in the upper part about four feet. In the deepest part of this acre of salt water, they last year placed some oysters enclosed in wicker baskets, partly to protect them against depredation, and partly because, being in a sluice-way, it was thought the wicker work might form points of attachment for the young oysters instead of their being drifted away by the tide. The baskets which were deposited in the month of May were taken up in November, when it was found that a considerable amount of spat had become attached to the wicker-work; and, contrary to what had been stated as to the results with the tiles, the young oysters were for the most part attached to the upper-side of the basket, and also to piles driven in the sluice-way as a protection against the earth washing away. Scarcely an oyster was to be found on the underside of the baskets. It was in contemplation to form a larger oyster-park in the river nearer to Harwich-harbour in a natural bay, which appeared very favourably situated for oyster cultivation; and the object of his inquiry now was to ascertain what depth of water it was necessary to have over the oysters at low tide, and whether it was indispensable that the water should be changed with every tide. His present experience did not enable him to give an opinion on these points. He believed, in the pond at present in use that the water was changed on an average once in two or three days; and as the breeding of oysters in an enclosure of that kind might be a new point to some present, he thought it his duty to bring it before the notice of the meeting.

Mr. **Bishop** mentioned that in the course of his travels he had seen an oyster lake similar to that described by the last speaker, and close to the shore. He noticed that planks of timber were placed in this enclosure, as he apprehended, for the young oysters to attach themselves to. The planks were kept in position by uprights, and worked in grooves to meet the rise and fall of the tide.

Mr. **Thomas Ashworth** remarked that the natural breeding ground of the oyster was upon rocks, and its natural feeding ground was in the mud; at the same time it must not be buried in the mud. It could only be bred on rocks, tiles, or other hard substances to which it could attach itself. It could not be bred on the upper side of the tile where there was half an inch of mud, or it would be smothered. On the grounds at the Ile de Ré, the tiles were placed in rows of six or seven in succession, the upper portion of the tiles being covered with a natural sediment deposited by the water, and it was only on the under side of the tiles that the young oysters were discovered. They were also bred on stones placed for the purpose, not arranged in the form of a wall, but overlapping each other, and it was on the under side of the stones that the oysters were principally bred. As far as the feeding and fattening ground was concerned, the important thing was to collect the young oysters from the tiles at a suitable period, and convey them to mud ponds or *claires*. Those ponds might be made of any convenient size. The walls were about two feet high, and were constructed of the soil obtained from the bed of the stream. With regard to the experiments at Ipswich, he did not think the plan would succeed in stagnant water, but that it required to be frequently changed. The spat would no doubt attach itself to every part of the basket which was not enveloped in the mud, and provided the tide was constantly running over it. There were salt ponds in the Ile de Ré, but they could not breed oysters in them, simply because there were no tiles or stones for the spat to attach itself to; these ponds were only suitable for feeding.

Mr. **Tegetmeier** mentioned, as a fact opposed to the theory of high temperature advanced by Mr. Buckland, that the whole of Switzerland received its supply of oysters from Frederikshavn, on the Cattegat, which was entirely removed from the influence of the Gulf stream, and was frozen over during the winter.

Mr. **Buckland** expressed himself delighted to reply to Mr. Tegetmeier, by showing him some specimens of North Sea oysters, which consisted of an immense quantity of shell and but little flesh, while the opposite qualities characterised the oysters from the more genial locality of Faversham.

The **Chairman** said it was now his duty to ask the meeting to acknowledge by a vote of thanks the very instructive paper with which Mr. Lowe had favoured them this evening.

The vote of thanks having been passed,

Mr. **Lowe**, in reply to Mr. Ridley, said, in dealing with so large a question it was impossible, within the limits of a single paper, to go into elaborate or minute details of each part of the operation. He might state that the walls in the parks were not intended to confine the water within them, but were only for the purposes of demarcation, and no artificial means were taken to confine the water. If any water remained over the oysters at low tide, it was only due to the configuration of the shore. With regard to the shallow-feeding ponds built on the upper part of the foreshore—the *claires*—the walls were made water-tight and about eighteen inches deep, and they retained the water over the oysters at low tide. As to the influence of the Gulf stream upon the temperature of this country, he was not presumptuous enough to deny the existence of that stream; he merely ventured to suggest that it was by some considered an open question. It had occurred to him that perhaps the beneficent effects of a mild temperature might be due to some other cause than this alleged large quantity of hot water called the Gulf stream; and when he found his own speculations borne out by the testimony of eminent practical men, he began to think there might be something in them.

The paper was illustrated by photographs, kindly shown in the magic lantern by Mr. Smith, representing:—1. Embryo oysters, magnified 140 times their natural size. 2. A piece of wood with oysters attached, of five different stages of growth, varying from 15 or 20 days to 12 or 14 months old. 3. Group of oysters attached to a piece of granite rock. 4. Group of oysters on a collecting tile. 5. Panoramic view of the Bay of La Tremblade, in the Ile de Ré, with oyster parks on the foreshores. On the table were specimens of various kinds of collecting apparatus—the plain and cemented tiles, shell tiles, faggot tiles, &c., also fine specimens of Colchester and Paglesham natives, Black Rocks, oysters from the North Sea, Prince Edward's Island, and of the pearl-bearing oyster.

Proceedings of Institutions.

Halifax Working Men's College.—The report, issued at Easter, being the end of the ninth year, says that looking at the classes as a whole, they have been well and regularly attended, and a very creditable amount of sterling hard work has been done, both by teachers and students. The committee offer their most hearty thanks to all who teach in the College, to whose unwearied exertions the whole success of the scheme must be assigned. There is one point with regard to the classes generally which the committee see with much regret, and that is, the large number passing through both Institutions in a single year, without remaining long enough to reap the benefits derived from them. During the past year, in the Working Men's College, including the Copley Branch, no fewer than 467 have been under instruction, with an average nightly attendance of 147, and a total on the books of 245. Taking the number of those now in the classes, who have attended regularly during the year, the fact is arrived at that considerably more than twice that number have passed through the College during the last 12 months. This shows how few proportionably possess the perseverance necessary to overcome the irksomeness of the first steps in the acquisition of knowledge. The same remarks apply to a great extent to the Young Women's Institute. Including the Copley Branch, 244 have been under instruction, while there are on the books 114, with an average nightly attendance of 80. Home requirements, however, interfere much with the regular attendance of the young women, as does also the call for extra labour with that of the young men. Seasons of great prosperity in manufacturing districts, by compelling in many cases extra hours of work, tell more against the success of working men's colleges than does a period of comparative dulness in trade. The success of the theological class has been great. The English literature class commenced with six young men, but for various reasons they have all been compelled to cease their attendance. The bookkeeping class still maintains its popularity and prestige. The French and singing classes are at present in abeyance. During the past year a class in political economy has been commenced. This is a subject which the committee most strongly recommend to the notice of working men as being likely to give them correct ideas concerning the common affairs of life. The science classes are still much too small for the credit of the district. In the Young Women's Institute a considerable number of the older pupils who had previously left have returned, and are now pursuing their studies most satisfactorily. A competitive examination on a small scale has been held this year, consisting of papers on history, geography, arithmetic, and domestic economy. Out of 77 female students, 69 voluntarily took these papers, and with the best results. The Copley Branches, both of the Working Men's College and Young Women's Institute, are going on well.

ART WORKMANSHIP PRIZES.

Our correspondent on this subject thus concludes his remarks:—

At the end of my third communication, published on the 14th instant, something was said on the history and probable origin of the famous bust styled "Clytie." It may not be unadvisable—with a view to future selections of models, not only for the class in question, *i.e.*, of chasing in bronze, &c., but for those allied to it, such as die-sinking, cameo-cutting, and the like—to offer a few remarks on the great superiority of the current and above-named model to that selected last year for the same class. I hope to make these remarks less particular than general, and intend to use the past example as the representative of a certain development of art, which it expresses in a happy and fortunate manner. My object is to state convictions of the value and, indeed, inexpressible importance of attending to nobility of style in choosing not less than in reproducing models for uses such as we now entertain.

The example preferred last year was the head and bust of a statue of "Psyche," by Mr. Gibson, a Royal Academician and sculptor, known, by his life-long endeavours to reintroduce—or it may be said to revive—the spirit and manner of antique sculptural art in this the nineteenth century. Apart from obvious objections to the use, on an occasion of this sort, of a work by a living artist, there is the less patent one—the force of which none will admit more freely than Mr. Gibson himself—that his production is not in any respect equal to the antique of which it is plainly a revival. In a series of works intended for translation, the value of which is derived above all things from perfection of style, there is a palpable objection to the use of examples which are attempted translations of methods of treatment and execution, as well as resuscitations of the informing spirit, of a long by-gone school, which worked and was moved by influences that are strange to us, and, above all, which addressed minds prepared to give the reception of faith to its productions, and had associations such as not even scholastic training can make live again. It is surely not desirable on the part of our art workmen to produce translations of translations, and it is least so when the example placed before them is not in itself peculiarly adapted to the tone of modern feeling. It is not in these days wise to attempt to revive antique methods of execution and phases of thought.

It would occupy too much of my space here to discuss the influence of moral and religious convictions, or even habits, on every branch of art; suffice it, that the Pagan and the Christian developments of design are separated by the width of a world of intellect, and that it is demonstrable how in no one sense are they identical. This is universally admitted, yet we find men devoting themselves not so much to the production of original works, as of such as they believe capable of producing impressions upon the minds of their contemporaries, similar to those wrought upon Greeks or Romans by the great sculptors of antiquity. This is exceedingly strange. It testifies powerfully to the admiration some of our best-known sculptors entertain for the prime examples of their art; it confesses want of confidence in their native powers, and, so far, to their own humility. Persistency in this matter has had, it would appear, fatal effects upon not alone the popular, but the real value of sculptural art in these days. There is something unreal about modern sculptures, wrought, as they mostly are, in the influence of the superstition, if I may so style it, above defined. Sculptors produce Venuses, Apollos, Dianas, and the like, but they cannot ever hope to get them received with the ardour of ancient times. Psyche is a nonentity to us; her very legend is comparatively little known; Venus is to most men but a naked statue; and Apollo needs the fire of Homeric verse to warm us to feeling how—

"—————————— his bow
And quiver cover'd round, his hands did on his shoulders throw;
And of the angry Deity the arrows as he mov'd
Rattled about him."

One result of the falsehood of antique motives and themes in modern sculptural art is the indifference of the public to its productions; the cold, unsympathising shadow of neglect lies upon them; and their purchasers are not so much of the highly-educated class as those upon whom scholastic influences have the greatest power. It is not a paradox to say that a learned man is not necessarily a highly-educated one. Modern sculpture is not the art of the people; it loses half its honour, and all its usefulness, in failing to be so. The antique, mediæval, and the true Renaissance phases of sculptural art were emphatically expressions of the feelings of commonplace, not necessarily vulgar men. How a commonplace Greek or Roman felt with regard to the statue of a god we can but half surmise. Mediæval artists were almost invariably middle-class men, and it was to the people, and in churches, cathedrals, houses, public places, and the like, that their appeal was made. Governments that were more or less popular, such as the republics of Greece and Italy, the great commercial cities of Venice, those of France, Flanders, Germany, and Holland, fostered and developed art simply as a necessity of existence, and not by patronage or the expression of the aristocratic, scholastically-educated class. We know that art has more than once culminated under imperial rule; but we also know that its splendour was derived from foregone efforts, and that it has invariably corrupted when it ceased to be the expression of the nation at large. Antique mythology is no expression of the mind of the English nation.

If this is the case, and no one doubts it, why should we borrow motives for art from times whose convictions, still less whose feelings, we do not share? Still less is it, then, desirable to use translations of expressions of those feelings and convictions, as models for modern workmen. If the question of mere theme—as in the choice of Apollo, Psyche, &c., as subjects for art—could be separated from that of execution, and production in art had nothing to do with a man's own heartfelt convictions of the eternal value of what he is about—had nothing to do with design, then these points need not trouble us. As, however, these are paramount questions, and lie at the roots of art and honest work of every kind, it behoves us to take them into full account. Suppose a sculptor is called upon to commemorate as a hero a man whom in his soul he knows to be a knave, what sort of a heroic statue is he likely to produce? To complete the circle of the subject, let us say that in like manner, in its degree, to that of a man entrusted with the statue of a *pseudo*-hero, does Mr. Gibson produce a charming bust, executed in a *quasi*-antique manner, but with the hard leanness of modern surface and jejune carving—so objectionable in such a case as this—the uninspired features, and an action that expresses nothing of Psyche. If this work is not Psyche, what is it?

As to the use of modern sculptural art to supply models in such a case as the present, there is its admitted inferiority to ancient works to be still further impressed on the minds of my readers by one little point, strictly applicable to this case, which will affirm all I have said. It is that no student of art, who is worthy of the name, ever studies by way of drawing from modern antiques—to these there is visible a dividing ocean between the originals and the new versions. That we should choose perfect exemplars of style for such offices as that in view is obvious enough.

If we are to go to the antique, let it be really at first-hand. The Venus of Milo is the noblest theme for style among female antique statues. No two things can differ more utterly than does that glory of the Louvre from the modern Psyche. Style being, as I said at first, the main thing in question for art-workmanship, I should, if the antique be admissible, prefer, above all things, this Venus. If mere execution, devoid of noble style, be desired, as it may be, no finer or apter example exists than the "Clytie," which, being a portrait, is not obnoxious to the objections urged against the employment of mythologic subjects in such a case as the present.

As concerns the other examples to be reproduced in the round and in relief—of which I have not yet ventured to confess a personal but not hastily-obtained conviction—such as the piece of Goutier work, selected for the section of ornament in the class of chasing in bronze, and the models for those of cameo-cutting and die-sinking, I am bound to say that with regard to the last two, the sections of the human head, the objection above stated as applying to the use of work by a contemporary artist is apparently insurmountable. In their way these are beautiful works, but very far from being so suitable to the current purpose, either in style or execution, as antique gems, or some of the finest of the quattro and cinque-cento ornaments, medals, and coins.

With regard to the selection of models such as those before us, the question of style is so transcendantly important, and the productions of the antique and later centuries so greatly surpass all others, that I regret something was not chosen out of the inexhaustible stores of beauty and learning still remaining open to us, and of which the Kensington and British Museums possess splendid examples, such as those that are by, or have a close resemblance to, the work of Sperandio of Mantua, Pisanello, De Pastis, Boldu, Donatello, or A. Dürer. Sculptures of this order exist that are beyond praise; and, knowing what they are, we shall ever lament that Cellini did what he was told to do by Clement VII., *i.e.*, to unset the jewels, and "smash up" and melt the gold of the Papal tiaras, the sacredotal vessels and ornaments deposited in the castle of St. Angelo. If we are to believe Benvenuto, he did this to such an extent and so effectually as to obtain two hundred pounds weight of bullion, mere brute bullion, in place of all that inestimable beauty which the genius and labour of scores of artists had imparted to its form. Ought Cellini to have done such a work as this?

That an example of Goutier work should have been selected for the purpose in question, or accepted as a work of art, all will lament who do not recognise anything beyond an exalted kind of upholstery in the prettiest, the most laboured, or the most fortunately imitative productions of that ingenious Frenchman. All that is intellectual and artistic is absent from productions of the class to which we are accustomed to give his name, much beloved as it is by cabinet makers and desired by upholsterers. There is in the mere finish and the want of meaning of this debased order of decoration much that is most enjoyed, because most readily understood, by the ignorant and uncritical. Artists refuse to admit that anything like style exists in the productions in question. To possess the characteristics of a style, objects must be rich in meaning and apt for special uses; as I said before, the arabesques that are common to all materials are vulgar; they possess no style, no significance, consequently we cannot recognise in them the intellectual capacity of their producers. It is this capacity that delights us in works of art; mere labour, especially when applied to other than strictly serviceable ends, satisfies us not. We tolerate, indeed admire, though we do not enjoy, labour applied to such things as chairs and tables, *per se*, and admit the honesty of the painstaking maker, blaming him not for ignorance of art. But, if laborious decoration is applied to them, all satisfaction ceases, because of the obvious painfulness, or, worse still, the heartlessness it has. I may add that the piece of Goutier work selected for chasing in metal, looks as insignificant as it can look; knocked off a "piece of furniture," it might be stuck on any other "piece" without the slightest loss to itself or gain to its recipient. The article whence it was copied would probably look not much the worse if the original were knocked off. This sort of divorce is fatal in good art. As to any appearance of facile accomplishment possessed by the object in question, it has none; it looks as if it had taken a hundred times as long to make as did the piece of chiselled iron work referred to in my last. I spoke of this beautiful iron arabesque as being of German origin; this may be the place to say that, after close inspection, I believe it to be French.

While referring to the importance of style, I cannot refrain from saying how much more valuable the new example chosen for the class of embroidering appears to me than that which accompanies it, and was adopted last year. In the latter—a sort of purse, or *Gypsire*, of German workmanship and design, and dating from the end of the sixteenth century—the border is truly beautiful; it consists of a pair of monsters, placed face to face at the foot, and whose tails form scrolls of rich character on the circumference of the object, and terminate in a pair of grotesque heads of not very valuable but receivable character. It is to the naturalistic or imitative style of the body of this work that I object; this bears, wrought upon it with a needle, a representation, in *pseudo* relief, of horns filled with flowers, baskets, &c. Now, as in most examples of modern Berlin wool-work, there has been neither art nor acquired knowledge exercised in the execution, any more than there was in the design of these horns and their accompaniments, it required no particular knowledge of the subject, nor any invention, to conceive two horns such as these, springing from the base of a basket, and curving out to fit the form of the purse. To represent them in relief was a woeful mistake, and attempting something wholly beyond the province of needlework. The attempt was almost worthy of poor Miss Linwood, an otherwise estimable person, whose exhibition of copies from pictures were the delight of our grandmothers, who, good and happy souls, were innocent of the true nature and limits of art. Doubtless, no one would have gone to see a set of mere pictures, painted in the ordinary manner by Miss Linwood, any more than folks would crowd to a collection of figures of murderers, royal personages, and the like, at Madame Tussaud's, if that ingenious female produced them in mere black and white. The attraction was, in the former case, that the needle did the office of the painting brush—which it certainly ought not to have assumed; and in the latter and current case, that the wax-work show produces things which the vulgar think are "so very like life"—which they certainly ought not to attempt to imitate—at any rate, not in the tawdry and unskilful manner they adopt. It is hard to say, having before us the spendour of art in some Florentine terra-cotta busts, wherein life was imitated to a hair, as may be seen in the North Court at the Kensington Museum—how far imitation is acceptable in portraiture, but it is certain that the skill must be supreme to make it endurable. Not so supreme is it in the wax-works, nor the flowers in our piece of embroidery. The Italian example of embroidery, which has this year been added to the German purse, is not only a beautiful piece of workmanship, and so eminently suited to the purpose in view, but the form and character of its design are perfectly apt to needlework. Here is an instance of the importance of considering the nature of the material to which decoration is applied. The arabesque of the needle will not do for the arabesque of iron, or wood, or stone, or gold, but it may be less unsuitable to that which is proper to painting *per se*, and come short only in so far as the needle comes short of the painting brush. Of course that "makes all the difference."

I am now brought to the consideration of the arabesques painted on the picture-frame adopted as the model for the second section (*b*), in Class 9, Decorative Painting.

This is a beautiful work, and is, in the architectural character of its form, perfectly beyond challenge; even now, although the colour has greatly faded, one can trace signs of its former splendour in that respect. Its decorative architectural character is, however, in many parts simulated and exaggerated. It is hard to imagine why the designer —when he arranged with such skill the proportions of the base, with its *dado* and plinths, that of the pilasters which form the sides, and the architrave with its frieze and bold cornice—consented to paint the dentils placed between the cornice and the frieze of his work, instead of allowing them to be solid facts, as he might well have done. The cost of doing this would have been minute and, I think, the effect better. All the ornaments, whether arabesques, guilloches, key-frets, waves, acanthi, the many forms of egg and tongue mouldings, &c., are combined with exquisite art, and had they been treated as honestly painted forms, and in the flat, however much enriched by duplication of outline, they would be perfect. As usual, the attempt to imitate sculptural relief by painting defeats itself. A carved frame so richly wrought as this one, but in a legitimate manner, would be splendid. As all its elements are those proper to relief, and none but the general architectural forms appear in the solid, it is probable that the former, as well as the latter, have been borrowed from an earlier work. Examples of such are not uncommon in great picture galleries; one or two may be seen in the National Gallery. The model given for the first section (*a*) of the class of Decorative Painting, taken from an original in Castel R. Pandino, near Lodi, is an excellent one in most respects. While on the subject of arabesques applied to frames, I may as well correct a slip of the pen concerning the date of the carved picture frame, which occurred in my second letter; I wrote 1550, the second 5 should have been an 0.

I do not remember to have met with a finer example of decoration applied to a material perfectly suitable to exhibit it, than that afforded by the leather cover of a jewel-casket proposed for the second section (*b*) of Class 17. It would be difficult to find a better arabesque than this one; but considered with regard to its office it is perfect, as shown by the broad and yet richly-formed masses, their flatness, so apt to use in leather-work, as not seeming to violate the peculiar sheet-like nature of the material, the dextrous introduction of the rayed form of ornament to the front of the article, and the tasteful, yet perfectly simple way in which the ends of the object have been decorated. The modern notion of decorating leather is to impress upon it elaborate forms, cutting them so deep that one feels how terribly heavy must have been the pressure to which the skin was subjected ere it took such a dint. One consequence of this sort of treatment is that the flexible and soft expression of leather is lost, its elasticity is parted with, and the observer feels that the material proper to such treatment was stubborn iron, indomitable brass, terra cotta that never had a sense, and wood the penetrable. The first example in the Class of Bookbinding and Leather-work (*a* 17) is a beautiful one, consisting of a book decorated with scrolls and inlays in the manner known as that of Count Grolier, dating probably about the first third of the 16th century. Few, if any, orders of decorative design have been so fortunate as those of the class in question; as a rule, Grolier work, and, with some exceptions, that of Maioli, which, in a general way, resembles it, leaves nothing to be desired. In this example the forms of the scrolls, their perfect adaptation to the space to be enriched, their simplicity, their flatness, and the manner in which the spurs and little cuspings appear united to the lines of the scrolls, no less than the beautiful proportions and outlines of the inlay-work, and the exquisite beauty of the back of the book, present a whole which is admirable.

My task ends with a few words on the subject of the model chosen for the class of Glass Blowing. In no branch of the applied arts have the English of our day made such rapid and satisfactory progress as in household glass manufacture. With much good fortune the advance has taken effect on useful objects, and we have obtained tumblers and wine-glasses such as Venetians or Florentines of old need not have been ashamed to use. The vulgar mistake of "cutting" glass is happily on the decline, and the legitimate appearance of the material, its soft and clear lustre, is displayed. The effect of this change upon the aspect of a tastefully-spread dinner table is remarkable, the flash, the restless glitter of the tortured glass, the scintillations as of a thousand sham jewels, have vanished, and the eye rests upon pure forms and pure materials. Prismatic effects are, of course, in some cases, legitimately obtainable, but they should never be seen under circumstances which call for the honest use of a material such as glass, cut in the form of a prism, with straight lines and angles, the look of hardness is given to it. Where flashy display, combined with cheapness, is desired, of course cut-glass retains its position. None but the best glass looks perfect when uncut, so that it often happens that the labour of cutting an inferior material does not raise the price of common articles to a level with that of the best. The ductility of glass, and its brilliancy, as well as its capacity for receiving colour, were never better illustrated than in the examples now in question. As we have succeeded so well in producing beautiful and serviceable objects of glass, it is time that its value in pure decorative qualities should be recognized. Possibly the offer of the Society of Arts of a prize in this class may lead to the introduction of models such as that before us, and utter banishment of the hideous French and "Hungarian" ornaments, so called, which are rife in this country. It will be a happy day when the last serpent of emerald green, the last ruby vase, the last begilded and enamelled trinket, and innumerable forms of tawdry trash are smashed, and their fragments swept into the great dust-hole.

Fine Arts.

MUSEE DE CLUNY.—This interesting collection is constantly receiving new and important acquisitions. The other day only there were exhibited for the first time two pictures in enamel, one representing Olympus, and the other Italian Comedy. At the back of one of these works is a printed paper, believed to be authentic, which describes the enamels as the work of Riaux, who is called "Enameller to his Majesty attached to the Court." A curious tablet in copper has also recently been purchased and added to the collection. It contains in three columns the names and trade marks of 146 goldsmiths of Rouen, and bears date 1408. Besides these and several curious old pictures, there has been added the Badelaire, a kind of sabre, or rather scimitar, which belonged to the Great Châtelet, whose arms are embossed on the hilt. This interesting relic was found during the demolitions that took place on what is now the Place du Châtelet, near the Hôtel-de-Ville.

FINE ART EXHIBITIONS IN THE FRENCH PROVINCES.—Exhibitions of pictures and sculpture are just opened at Nancy, Evreux, and Spa, and that of Mons is announced for the 22nd instant. Amongst the works which have attracted attention at the Bordeaux Exhibition are two pictures—"Cupid causing the Chase to be neglected" and "Hunting Day." It is to be regretted that not a single English name appears in the list of awards made by the jury of the present Paris exhibition.

SALES OF WORKS OF ART IN PARIS.—The advance of the season does not seem to have frightened amateurs from the auction room; every day has its sale of more or less importance, and the prices obtained are remarkably high. At the sale of the collection Piot the other day, a small plate, or tazza, called *cuppa amatoria*, with a blue ground decorated with enamelled arabesques in white, and bearing a shield with the arms of Medicis and Baglioni united, with another of a similar kind, fetched £32. A plateau, representing female figures posed in a zodiac, after Raphael, engraved by Marc Antoine, the work of Dureta, fetched £16 8s. A small hemispherical cup, with ruby coloured and golden reflections, the work of Gubbio, £16. A covered caudle cup, by Urbino, decorated on the outside with landscapes, in the interior with a subject of nurses and children, and bearing on the cover a figure of a lady reclining and receiving visitors, £20 4s. A small tazza by the same, ornamented with a subject from the story of Pysche, £44 8s. A remarkably brilliant and beautiful Persian silk carpet, about seven feet by six, no less than £160. A child riding on a snail, by Tullio Lombardo, a statuette about 14 inches high, fetched £184. A fine vase of the fifteenth century, about a foot high, £197. A cup on a high foot, decorated with coats of arms of the patrician family of Venier of Venice, supported by genii, about 12 inches high and of nearly the same diameter, £122. A terra-cotta group, by Donatello, the Virgin adoring the Infant Jesus, £100; this bas-relief is surrounded by an architectural arrangement, the pilasters being surmounted by a Corinthian pediment, in wood, carved and gilt, also supposed to have been the work of the same artist. Two recumbent figures in terra-cotta, by John of Bologna, after "Night and Meditation," by Michael Angelo, £70. Christ crowned with thorns, a bust, life-sized, in enamelled ware, by Lucca Della Robbia, from the gallery of the Marquis of Gerini, at Florence, £81. Bas-relief by the same, representing the Virgin seated, with the Infant on her knees extending his hand towards a lily, a small work, £120.

The Louvre.—The great changes which have taken place of late in the Museum of the Louvre have been completed, as far as regards the chief floor of that noble establishment, by the re-opening of the room known as the Salle des Séances, and in which the pictures of the battles of Alexander, by Lebrun, were for a long time exhibited. This room is now occupied by the Musée Napoleon III., which was displaced in consequence of the re-arrangements rendered necessary by the accession of the Campana and Sauvogeot collections. The walls are painted red, of a tint somewhat darker than that of Pompeii, and this serves as an admirable background for the objects set up near it. Large glass cases occupy a portion of the wall-space, and in the centre of the room are three well-arranged stands. These latter are covered with a collection of large Etruscan vases of the oldest period, and with Etruscan sarcophagi of various periods, some surmounted by figures of the deceased, and others decorated with rich sculpture in bas-relief. In the glass cases are—large bas-reliefs which served as friezes and metopes in various temples and tombs; fine vases of Canossa, with figures in cameo; a vase from Cuma, with cupids and flowers in relief, painted and gilt; a collection of terra-cottas of Ardea and Cyrenaica, already well known to connoisseurs visiting the Louvre. Four grand candelabra, two of which are in marble, and two in bronze, fill up the inter-columnar spaces at the ends of the room. The fine bronze reproduction of the *Victoire*, of Brescia, occupies a conspicuous place. There not being space enough in the glass cases in the Salle des Séances for the whole of the terra-cottas, the rest are now being placed in the adjoining room with the beautiful carved wood ceiling, and known as the Salle Henry II. Within twelve months the following portions in the Museum have been opened to the public—eleven rooms containing the antique ceramic works of the Musée Napoleon III., three others occupied by the pictures from the Musée Campana, two containing objects of the period of the Renaissance, and the two new galleries which now contain the pictures of the French school.

Manufactures.

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Town Window-Gardens.—It appears, by an article in the *Gardener's Chronicle*, that the Coalbrookdale Iron Company have recently brought out a convenient apparatus for facilitating the arrangement of flowers outside windows. A semi-circular iron flower-bed, four feet in width by two feet of projection and nine inches in depth, receives, besides the broken crocks, &c., for drainage, two barrowfuls of garden mould, affording (even in cities, especially at upper windows, where the stratum of air is purer), the production of large groups of flowers in great perfection. These window gardens afford great safety at nursery windows, a little light wiring for creeping plants being in addition, if desired, affixed at and above the out circle of the gardens. These window gardens are made of iron, either galvanized or treated with anti-corrosive material, and the company call attention to their safe and easy mode of fixing. A wrought-iron bent bar, somewhat like a horse-shoe in shape, supporting the window bed, is first put into the wall by two holes, and fixed by cement, which is done without scaffold and from ladders, and remains to set without weight being put on it; and next day the garden bed can be lifted in from the windows on to this, no bolts being requisite. This done, the bed may at once receive the crocks and garden mould, and the flowers be planted in the earth, level with the top of the sill. In the cases of the sills being part of a string course, or in any other case, the company have modes of modification so as to meet all circumstances. In all cases, however, the main support depends on the wrought-iron bars beneath let into the wall. The correspondent of the above journal says:—"We must remember the incalculable advantage to all town and London-grown plants of being lifted up from the ground. The first time I tried the plan myself it was where there was a back garden, deep down and well-like, in which not a thing would grow. A little breakfast-room window looked out upon this 'dampery,' and there I got my boxes fixed, raised above the level of the surrounding walls, the plants enjoying the free current of air that now passed round them. The way in which that garden throve attached me for life to this plan. The soot and smoke may be bad in towns, but that I don't think is the real grievance. It can after all be washed off; it is the stagnant air, or the no light in some cases—the scorching sun in others—that kills and stunts town plants. All these worst of evils, because those beyond our own remedy, it seems to me are removed by these iron window gardens. The one that I saw in use was filled with spring bulbs and flowers, and these, as I understood, were planted in the soil. But I would advise all gardeners on setting up these contrivances to use abundant charcoal drainage, and then above it a layer of cocoa-nut fibre or else dry móss or grass. The same padding I think may well extend round the front rim. The plants can then be kept in their own pots by all means, and clematis, cobœa scandens, and sweet pea, canariensis and ipomœa, ivy and convolvulus, I know will flourish luxuriantly. Roses I have had flower well, but not in a very smoky place; stocks, mignonette, lobelias, geraniums, and heliotropes, arums, and fuchsias have also grown and flowered well. It is chiefly, I imagine, because they can be well watered, and because they have the great benefit of free air. And then what a benefit they are to our little dull-looking breakfast rooms or studies, and what a very great pleasure they will give to the London artisans, than whom few are more hearty flower lovers or more interested gardeners, if they can have for their parlour window such a country-like bed of sweet flowers." In the window-gardens already produced by the Coalbrookdale Company the decorations consist of natural objects, such as birds, &c., for which their foundry is distinguished, and some of these are to be exhibited in the Horticultural Gardens on the Queen's birthday.

Colonies.

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THE ALPACA IN AUSTRALIA.—The last accounts from Australia state that all the hopes which had been entertained of the naturalisation of the Peruvian alpaca have been disappointed. Of the 300 introduced by Mr. Ledger from Peru, five years ago, and purchased by the government of New South Wales for £15,000, the whole have died off, and their progeny, numbering 330, are in an unhealthy condition. During a discussion on the subject in the colonial legislature nearly every speaker was in favour of the government immediately getting rid of the cost of keeping them, and a resolution was accordingly adopted that they should be disposed of as soon as possible.

MELBOURNE TRADE.—The following table gives the imports and exports at the port of Melbourne for the first six weeks of the year as compared with the corresponding weeks of 1863:—

Imports, 1863...	£1,896,272	Exports, 1863 ...	£1,641,418
,, 1864...	2,204,241	,, 1864...	1,420,745

Stocks of goods in bond at Melbourne on 20th February:—brandy, 6,011½ hhds., 84,259 cases; rum, 1,096½ hhds., 1,079 cases; gin, 132 hhds., 176,461 cases; whiskey, 1,084 hhds., 25,598 cases; sugar, 241 casks, 224,624 bags; coffee, 714 casks, 514 bags; tobacco, 669 casks, 9,638 cases and bales.

Notes.

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THE ALBERT MEMORIAL.—The works in connexion with this national memorial have been commenced by Mr. Kelk, to whom the execution of the entire contract has been intrusted. The site chosen for it is in Hyde-park, almost facing the entrance to the Horticultural-gardens, and on this spot the excavations for the foundation are being made. From the great height (160ft.) and the immense solidity and massiveness of the memorial, the foundations have to be taken unusually deep, considering the excellent nature of the soil, which is all gravel. Under the centre part they are to be formed of 16 feet of concrete, and nowhere are they to be less than 10 feet. The base of the memorial is to consist of broad and lofty flights of steps that give access to the work on four sides, and the work itself is to be no less than 130 feet square. The steps of gray granite are to be laid in a double flight, with a broad landing between the lower and upper tier. From this upper landing the memorial proper will rise, the basement being formed of a noble frieze in marble, the figures on which will be in high relief and of life size. The columns which support the spire-like superstructure of the memorial are to consist of groups of four red granite pillars, each 2ft. in diameter. Their capitals are exceedingly rich, and will be surmounted with statues of heroic size. The spire, if it may be so called, which closes in the arch, is one of the richest and most elaborate of all Mr. Scott's designs. It will be built of red and gray granite, and the rich white stone known as Darley Dale. The terminal and surmounting cross will be of wrought copper gilt, and this portion of the work is to be executed by the Skidmore Art Company, whose rood screen in the transept of the last Exhibition excited such admiration for its exquisite finish. Beneath the groined arch will be placed the statue of the late Prince Consort. His Royal Highness is represented in robes of state, seated on a chair of state. The proportions of the figure are on a scale which, if the statue was represented standing, would give it a height of 30ft. The details of this figure and of the other groups of statuary which will surround the memorial are, however, still undecided. The whole work is expected to take four years in completion, and by the terms of his contract Mr. Kelk has bound himself to complete it for the sum in hand, £120,000. The laying of the foundation stone will be marked by a public ceremonial, at which the members of the royal family will be present. No date is fixed for this event, which, indeed, is not likely to take place till late in autumn.

THE DUBLIN EXHIBITION.—This will be held in the same building in which took place its predecessor of 1861. For some time past preparations have been going on; the nave has been divided from the wings of the hall by a wooden partition, the whole has been boarded over and painted in light colours, and behind the main building, in the space known as the Shelbourne-yard, now stands a building of iron and glass which will be devoted to the purposes of a machinery court. All the space to be disposed of has been parcelled off. The principal Irish manufacturers are among the exhibitors; and the most eminent makers of machinery in England also contribute. The department of the Fine Arts promises to form a most attractive feature. The National Gallery and the South Kensington Museum will send contributions; continental artists, as well as English and Irish collectors, are sending some of their best pictures. Irish artists, of course, have not neglected this opportunity of displaying their powers. An imposing inauguration is promised for the 25th of May, for which Dr. Waller has produced an appropriate ode, the music by Dr. Stewart, while all the leading artistes of the city are engaged as vocalists, and 200 ladies and gentlemen are to form a chorus. The prospectus says:—"The principal department will consist of articles of exclusively Irish manufacture. The machinery court will contain machines of the newest and most improved construction, suited to manufactures of various kinds, amongst which will be exhibited the most modern appliances used in the production of linen and woollen fabrics, and which will be exhibited in motion. Each of the varied industries of the country will be fully represented. Specimens of all the minerals of the country will be exhibited. How the water-power of the kingdom may be economised, so as to employ it in manufactures at a small expense, will be shown. How the bogs may be utilised, so as to render them sources of wealth, will also be exhibited by the application of new and important discoveries. It is intended to have musical performances, upon an enlarged scale, morning and evening, during the Exhibition."

Correspondence.

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VACANT NICHES IN LONDON.—SIR,—Your last correspondent on this subject mentions, among niches vacant in London, the numerous ones which occur in the outer walls of St. Paul's Cathedral, and it may be hoped that while the authorities are occupied in the decoration of the interior of the building the outside will not be neglected. Both your correspondents allude to the use of terra-cotta for such decorative subjects as should complete the effect of the edifices they mention. I suppose neither of them are among those who have been deceived in the use of this material, by having purchased terra-cotta vases either made of bad materials or insufficiently baked. The truth is, I believe, that some terra-cotta is mere rubbish, and will not stand the atmosphere, and this material for art has fallen into much disrepute in consequence in some quarters. This is, however, unfair to really good terra-cotta, fully baked, or "fired," as the manufacturers call it. Such terra-cotta is, I believe, among our most durable materials, while other terra-cottas, insufficiently submitted to the action of fire, are more like what the builders call a "salmon brick," and are not to be depended on when exposed to the alternate action of frost and sun. The less-burnt terra-cotta will answer very well for interiors, and many of the sketches of figures and groups by the Italian masters, not intended for exposure, are in this lightly-burnt terra-cotta, but such material as this would not do for the open air in such a climate as ours. As terra-cotta offers advantages, from its comparative cheapness and ease of repetition, it might be well that it should be relieved from any odium occurring from previous failures in the open air of unsuitable specimens, and that in future care should be taken in selecting, for exposed situations, only such qualities of terra-cotta as will stand wind, rain, sun, and frost.—I am, &c., VITREUS.

MEETINGS FOR THE ENSUING WEEK.

MON. ...R. Geographical, 1. Annual Meeting.
TUES. ...Medical and Chirurgical, 8½.
Civil Engineers, 8. Mr. G. R. Burnell, "On the Machinery employed in Sinking Artesian Wells on the Continent."
Zoological, 9.
Ethnological, 4. Annual Meeting. 8. Dr. Donovan, "On Empirical and Scientific Physiognomy as applied to the Study of Races of Man and Individuals."
Royal Inst., 3. Professor Marshall, "On Animal Life."
Linnæan, 3. Annual Meeting.
WED....Geological, 8. 1. Capt. Godwin-Austen, "Geological Notes on part of the North-Western Himalayas." Communicated by Mr. R. A. C. Godwin-Austen, F.R.S. 2. Prof. T. H. Huxley, F.R.S., "On the Cetacean Fossils termed *Ziphius* by Cuvier." 3. Mr. W. B. Dawkins, "On the Rhætic Beds and White Lias of West and Central Somerset."
Archæological Assoc., 8½. 1. Rev. Mr. Cardew, "On Sepulchral Antiquities found at Helmingham, Suffolk." 2. Mr. Pettigrew, "Obituary Notices of Members deceased during 1863."
THUR. ...Royal, 8½.
Antiquaries, 8.
Philosophical Club, 6.
Royal Inst., 3. Mr. John Hullah, "On Music (1600—1750)."
FRI.......Royal Inst., 8. Mr. Reginald S. Poole, "On Greek Art."
SAT......R. Botanic, 3¾.
Royal Inst., 3. Mr. Alex. Herschel, "On Falling Stars and Meteorolites."

PARLIAMENTARY REPORTS.

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Par.
Numb.

Delivered on April 21st, 1864.

206. Regium Donum—Return.
208. Army Prize Money—Account.
211. Army (Sums paid in lieu of Pension, &c.)—Statement.
212. Army (Officers on half-pay with Civil Situations)—Return.
220. Malta New Dock—Return.
117. British Museum—Returns.
71. Bills—Penal Servitude Acts Amendment (amended).
72. — Charitable Assurances Enrolments.
73. — Customs and Inland Revenue.
74. — Promissory Notes and Bills of Exchange.
China (No. 5)—Memorials, &c., on the subject of opening up a direct Commerce with the West of China from the Port of Rangoon.

Delivered on 22nd April, 1864.

173. Woods, Forests, and Land Revenues—Abstract Accounts.
192. Ancient Laws and Institutes (Ireland)—Paper.

Delivered on 23rd and 25th April, 1864.

202. Greenwich Hospital—Returns.
205. West India Incumbered Estates Act (1862)—Returns.
153. Life Boats, &c.—Return.
168. Post Office Savings Banks—Account.
183. National Debt (Savings Banks)—Account.
210. Queen's College (Cork)—Copy of Correspondence.
225. Manufacturing Districts Acts (1863)—Report by Robert Rawlinson, Esq.
226. Seat of Under Secretary of State—First Report from Committee.

Delivered on 26th April, 1864.

216. Broadmoor Criminal Lunatic Asylum—Report of the Commissioners in Lunacy.
219. Barnstaple Election Petition—Minutes of Evidence.
224. Pollution of Streams—Copy of a Letter.
Civil Service Commissioners—Ninth Report.

Delivered on 27th April, 1864.

187. Army (Maps, &c.)—Return.
214. Dublin Port—Return.
North America (No. 10)—Despatch from Lord Lyons, referring to the alleged Report of the Secretary of the Navy of the so-styled Confederate States.

Delivered on 28th April, 1864.

105. Post Office Packet Service—Estimate.
201. Immigrants and Liberated Africans—Return.
218. Ancient Laws and Institutes (Ireland)—Return.
228. Army, &c.—Account of Receipt and Expenditure.
76. Bills—Summary Procedure (Scotland) (amended).
77. — County Bridges.
78. — Court of Chancery (Ireland).
79. — Civil Bill Courts (Ireland) (amended in Committee and on re-commitment).
80. — Local Government Supplemental.
81. — Lands and Heritages (Scotland) Act Amendment.

Delivered on 29th April, 1864.

66 (3). Trade and Navigation Accounts (31 March, 1864).
226. Seat of Under Secretary of State—First and Second Reports from Committee.
235. Bankruptcy (Ireland)—Return.
Charity Commission (England and Wales)—Eleventh Report.
Greece (No. 1)—Papers.
Greece (Union of the Ionian Islands)—Treaty.
Greece (Claims for Services in the Ionian Islands)—Convention.

Delivered on 30th April and 2nd May, 1864.

221. Teinds (Scotland)—Return.
233. Sheffield, Chesterfield, and Staffordshire Railway Bill—Minutes of Evidence.
234. National Portrait Gallery—Seventh Report of Trustees.
239. Army (Limited Service)—Return.

Patents.

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From Commissioners of Patents Journal, May 13th.

GRANTS OF PROVISIONAL PROTECTION.

Axle tree with levers—749—A. Blouin and N. D. Mercier.
Buttons—278—P. W. Gengembre.
Carriages, &c., tin-expanding canopy for—947—T. L. Scowen.
Clothes, &c., washing and wringing—1056—T. J. Searle.
Coining, machinery for—998—J. Abraham.
Dancing toys—61—M. B. Westhead.
Emery papers—827—R. J. Edwards.
Hydro-carbon oils, &c., treatment of—1021—J. E. Duyck.
Lamps—943—G. A. Tremeschini.
Looms—936—J. Bullough.
Musical instruments—935—P. A. L. de Fontainemoreau.
Puddling iron—885—J. Lloyd.
Quillai tree, obtaining a semi-fluid or solid product from—999—H. A. Bonneville.
Ships' cooking apparatus—945—A. R. Le Mire de Normandy.
Steam, apparatus for condensing—1051—W. Thorold.
Titanic iron sands—1058—B. F. Brunel.
Urinals—1043—J. Symes.

INVENTION WITH COMPLETE SPECIFICATION FILED.

Corks, bungs, &c., machinery for cutting—1133—W. Davies, and G. and W. Cate.

PATENTS SEALED.

2874. C. W. Harrison.
2879. V. Baker.
2881. W. Pratchitt, J. Blaylock, and J. Pratchitt.
2882. T. C. Kimpton.
2891. J. Mackey.
2893. J. C. Jennings and M. L. J. Lavater.
2897. J. Eglin.
2903. J. Kirkham.
2904. E. Walker.
2905. J. Colyer.
2907. E. Christmas.
2911. W. B. Hodson.
2912. G. Rait and J. Winsborrow.
2913. J. Seward and H. Smith.
2915. B. Dobson, E. Barlow, and P. Knowles.
2918. A. H. Ferry.
2921. T. Brinsmead.
2931. F. Fenton.
2932. W. Williams.
2935. E. Finch.
2937. A. Simoneton.
2940. M. B. Westhead.
2960. J. Sibert.
2962. C. L. Daboll.
2987. H. Hirzel.
3083. J. Aubert.

From Commissioners of Patents Journal, May 17th.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

1239. W. Mitchell.
1197. W. Wilson.
1198. C. W. Lancaster.
1225. J. Bullough and J. Bullough.
1310. R. Mushet.
1226. G. S. Goodall.
1282. J. Sidebottom.
1253. D. K. Clark.
1258. T. Dunn.
1267. P. Ashcroft.
1275. J. Hughes.
1276. F. O. Ward.
1278. W. Clark.
1286. G. E. Donisthorpe.
1294. Y. Parfrey.
1302. G. E. Donisthorpe.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

1320. C. W. Siemens.
1340. J. R. Cochrane.
1345. S. Yeldham.
1363. G. Crawford.
1404. E. A. Cowper.
1344. T. Briggs and J. Starkey.
1470. J. Crossley.

Registered Designs.

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Rack pulley—4633—Frank P. Fellows, Snow-hill Works, Wolverhampton.
Lever rod for expelling exploded cartridge cases from repeating fire-arms—4634—Phillip Webley and Sons, Birmingham.
Frame for bags and other like receptacles—4635—Moritz Bergman and Company, 21, Queen-street, E.C.